Livestock feeding in the Africa RISING project intervention zones of Mali

1. Introduction

The ability of small ruminants to grow, develop, reproduce and produce meat and milk is influenced by how much they get to eat and the quality of what they eat. Without an adequate nutrition, all these functions slow down or cease. Providing adequate feed for animals the year round can be a problem in Mali. Natural grazing lands are the main feed source of ruminants. Quality and availability of feed vary tremendously between seasons and years. As results, weight losses of up to 15 to 20% of body weight were reported by Wilson, 1988 and/or high mortality and reduced performance in milk production and reproduction occur during the dry season as well (Nantoumé et al, 2011).

To provide the extra and appropriate feed needed to cover the animal demands during the dry season several techniques are available. The most important are silage making, hay making, physical treatment (chopping) and urea treatment of forages. First of all, it is important to know more about feed availability and quality and the related problems of feeding livestock during the dry season in the study area. So, a survey has been conducted, with the objective to identify the research and development needs for optimum and efficient utilization of poor forages to enhance livestock feeding during the dry season.

1. Material and methods
2. 1. Study area

The intervention sites of the Africa RISING project in Mali (Fig. 1) include two zones, Bougouni and Koutiala in Sikasso region as shown in Figure 1.

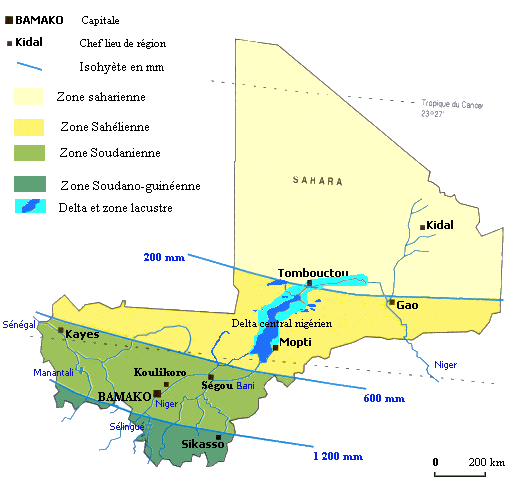


Fig.1. Bioclimatic map of Mali Fig 2. Africa RISING project intervention sites in Mali

This study has been conducted in four communes of the Bougouni area precisely in the four villages that are the intervention sites of the project Africa RISING during its first phase. The four villages are Flola, Madina, Diéba and Sibirila.

1. 2. Method

A random sample of 10 persons (six men and four women) has been taken from each village and surveyed using a questionnaire. The questionnaire was divided into 7 parts: 1) Identification of the household, 2) Main activities of the surveyed person, 3) Species of livestock raised, 4) Types of feed used as supplements, 5) How feeds supplements are managed? 6) Experience in upgrading poor forages and 7) Suggestions to improve livestock feeding. Two steps were involved: the first step gave to the groups of participants, the objective and a broad explanation of the content of the survey. The second step intended an individual and detailed survey of the content of the questionnaire. Four numerators were trained to accomplish the two steps (in group and individual) of the survey as shown in Figures 3 to 5 in the four villages.

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| C:\Users\hp\Documents\LaBoNa\Africa Rising\Planning activités 2016 AR\Photo Dr Nantoume\IMG-20170918-WA0033.jpgFigure 3. Survey in group | Figure 4. Individual surveyC:\Users\hp\Documents\LaBoNa\Africa Rising\Planning activités 2016 AR\Photo Dr Nantoume\IMG-20170918-WA0009.jpg |

1. Results and discussion
   1. Characteristics of the study area

Four communes of Bougouni area, in the soudanian zone of Mali were involved in the survey. The surveyed communes were were Faradiélé, Kouroulamini, Danou and Faragouaran. Only one village was chosen per commune. The number of villages was relatively low but reflects the objective of the project that is to take into account only the villages involved in the phase one of the African RISING project. The characteristics of the four villages as described by INSAT-Mali (2016) are presented in Table 1. Based on that table, the sample of 40 people taken in this study represents 6.80% of the household number or 19.42% of the household number. The result of 6.80% seems low as percentage of people to be surveyed in agricultural studies, but 19.42% of a given household population is enough and representative sample especially in a relatively homogenous population.

Table 1. Characteristics of the four surveyed villages (from INSAT-Mali\*, 2013)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Villages | Communes | Population | | | Household number | Household number | People per household | People per household |
| Men | Women | Total |
| Flola | Faradiélé | 219 | 246 | 465 | 68 | 21 | 7 | 22 |
| Madina | Kouroulamini | 773 | 809 | 1582 | 228 | 79 | 7 | 20 |
| Diéba | Danou | 533 | 588 | 1121 | 179 | 61 | 6 | 18 |
| Sibirila | Faragouaran | 440 | 489 | 929 | 113 | 45 | 8 | 21 |
| Total |  | 1965 | 2132 | 4097 | 588 | 206 | 28 | 81 |
| Average |  | 491 | 533 | 1024 | 147 | 52 | 7 | 20 |

INSAT-Mali: Institut National de la Statistique-Mali.

* 1. **Identification and characteristics of the households**

The participants to the survey were identified through their sex, age, ethnic group and household size. A total of forty people were surveyed including men and women in each village. More men were surveyed with an average of 62.5% of men and 37.5% of women.

The age of the surveyed people fluctuated from 15 to 80 with an overall average of 42. The difference of average age between the four villages was small, 48, 43, 40 and 43 for Diéba, Flola, Madina and Sibirila respectively.

Several ethnic groups have been surveyed. In the villages of Diéba and Flola, all the surveyed people were Bambara. Four ethnic groups were involved in the village of Madina. They were Sarakolé (60%), Fulani (20%), Bambara (10%) and blacksmith (10%). For the village of Sibirila, three ethnic groups were involved, Bambara (70%), blacksmith (20%) and Niamakala (10%).

The overall average of the household size was 27. The average household sizes fluctuated among the four villages. They were as follow 40 for Diéba, 35 for Flola, 13 for Madina and 21 for Sibirila. INSTAT (2016) has defined the following household size and types: very small households with one to two people, small households with three to five people, large household with six to eight, and very large household with nine to twenty five people. So, any household with more than 25 people is excluded. The four types are distributed as follow in the rural area: 13.7% for the very small household, 37.5% for the small household, 27.5% for the large household and 21.4% for the very large household. Based on the rules of INSTAT (2016), some of the types will be excluded. Therefore, 7 out of ten households of Diéba, 4 out of 10 households of Flola and 4 out of 10 households of Sibirila could be excluded as households. The family may be misclassified as household especially if there is a household in which one or more sons are married and instead of distinguishing them as separate households are considered as the same household.

* 1. **Occupations of the surveyed farmers**

The activities conducted by the farmers for living include cropping, livestock keeping and sale (trade). In general, cropping was identified as the main job in all the four villages. Cropping was identified was identified as the main activities by 100% of the surveyed people in Diéba, Flola and Sibirila and 90% of the population of Madina. Livestock has been cited as the secondary activity in general.

For the villages of Diéba, Flola, Madina and Sibirila, livestock has been recognized respectively by 60%, 100%, 90% and 20% of the investigated people as the secondary activity in the four villages. This result shows that livestock is very important mostly in Flola and Madina while less important in Sibirila.

Several activities are given as income raising activities. They include trading, traditional gold mining, legume cropping, civil servant, etc. Trading includes any types of sales such as extra crops, livestock sales, condiment sales, etc.

* 1. **Livestock raised**

Livestock raised includes cattle, small ruminants (sheep and goats), horses and donkeys (table 2). From table 2, it appears that livestock populations (cattle, sheep goats and donkeys) are greatest in Flola compared to the other three villages. Horses exist only in Madina. Cattle appears to be the largest population per species but put together small ruminants (sheep and goats) are the largest.

Table 2. Livestock raised in the four villages

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Cattle | Sheep | Goats | Horses | Donkeys |
| Diéba | 62 | 53 | 70 | 0 | 13 |
| Flola | 220 | 125 | 145 | 0 | 22 |
| Madina | 71 | 32 | 49 | 6 | 4 |
| Sibirila | 69 | 26 | 38 | 0 | 6 |
| Total | 422 | 236 | 302 | 6 | 45 |

* 1. **Feed supplementation**

Feed supplementation is known and practiced by all the surveyed people. Several feed supplements are used to feed different animal species especially during the dry season, period in which feed shortage occurs. During the dry season, animals lose weight, produce less milk, become weak and easily seek and give less output at work. So, to maintain or enhance health and productions (gain, milk, work, etc) feed supplements are given to animals. The main feed supplements used include bush hay, corn straw, sorghum straw, millet straw, rice straw, peanut haulm, cowpea haulm, tree/browse leaves, cultivated forages and others. The importance of using a given feed supplement has fluctuated among the villages.

Tree/browse leaves are the most commonly used as stated by more than 95% of the interviewed people. Although most of the tree/browse leaves are sold in the city of Bougouni, they are free of charge or free access and there is however a cost to get them. Besides, most of the time, they are cut without any control although Kamissoko et al. (2002) had developed techniques for better cuts of the tree/leaves.

On the other hand, a few people, 22.5% and 30% of the surveyed population use cultivated forages and bush hay as feed supplements respectively. A long time ago, several species of forages (*Dolichos lablab*, *Macroptilium atropurpureum*, *Macroptilium lathyroides*, *Stylosanthès hamata*, *Panicum maximum*, *Bracharia riziziensis*, etc.) have been introduced for cultivation both on-station and on-farm situations. Good results were obtained from on-station trials (Sotuba, Niono, Mopti, Kayes). However, results from extension were low compared to the expected ones. Like in the four villages surveyed, rare are the villages in which forages are cultivated in optimal conditions to overcome feed scarcity during the dry season because of several constraints. Some of them are good seed availability, conflict of time or time constraint, management of the field to make the forages available to animals, land availability, costs of production, etc..

Crop residues (cereal straws and leguminous haulms) are commonly known and used as feed supplements to overcome feed scarcity during the dry season. Sixty to 95% of farmers surveyed use crop residues except for millet that is the least produced crop in that zone.

Other feed resources such as bran, any cook residues and salt are commonly used as feed supplements.

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| --- | --- | --- | --- | --- | --- |
| Table 2. Percentages of feed resources used by farmers as supplemental feeds in the Bougouni zone of the Africa RISING project | | | | | |
| Items | Diéba | Flola | Madina | Sibirila | Average |
| Bush hay | 0 | 10 | 60 | 50 | 30 |
| Corn straw | 50 | 100 | 60 | 70 | 70 |
| Sorghum straw | 10 | 100 | 60 | 70 | 60 |
| Millet straw | 0 | 100 | 20 | 60 | 45 |
| Rice straw | 70 | 100 | 60 | 70 | 75 |
| Peanut haulm | 100 | 100 | 80 | 100 | 95 |
| Cowpea haulm | 100 | 100 | 80 | 90 | 92.5 |
| Tree/browse leaves | 100 | 100 | 100 | 90 | 97.5 |
| Cultivated forages | 0 | 10 | 20 | 60 | 22.5 |
| Bran and salt | 80 | - | 90 | 20 | 63.3 |

Experiences of farmers in upgrading poor forages have been investigated. All the feed supplements were used as they were collected. Fresh tree/browse leaves were fed to small ruminants (sheep and goats). Dried leguminous haulms were also fed to small ruminants. Dried cereals crop residues were collected including leaves and stems and fed to all species (cattle, small ruminants, horses and donkeys). Any supplemental feed was given as silage, hay, chopped or treated using urea. Upgrading poor forages through silage, haying, chopping and urea treatment are not new techniques but not known or adopted by farmers.

* 1. **Feeding constraints during the dry season**

In general it is recognized by most farmers (87.5%) that providing appropriate feed to livestock during the dry season is a constraint to livestock development in that area of Mali. Only 12.5% of the surveyed farmers and all from Madina have no feed shortage during the dry season. Several factors contribute to feed shortage such as fire, drought, lack of water points, lack of equipment, difficulties in cutting, handling and transporting, lack of training on processing, etc.

* 1. **Suggestions to enhance livestock feeding**

Capacity building trough training for upgrading poor forages, subsidize equipment and feed to increase feed availability are the main constraints of livestock feeding during the dry season.

* 1. **Conclusion and perspectives**

Constraints in livestock feeding during the dry season were assessed in four villages of the Bougouni zone of the Africa RISING intervention area of Mali. Characteristics of the villages and the farmers were described. Livestock keeping is one of the most important activities conducted by the farmers for living. Most farmers (87.5%) agree that providing appropriate feed to livestock during the dry season is the most important constraint to livestock development. Feed supplementation is roughly known and practiced by few livestock farmers. The most important suggestions given to enhance livestock feeding during the dry season were capacity building and subsidizing equipment and feed.

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